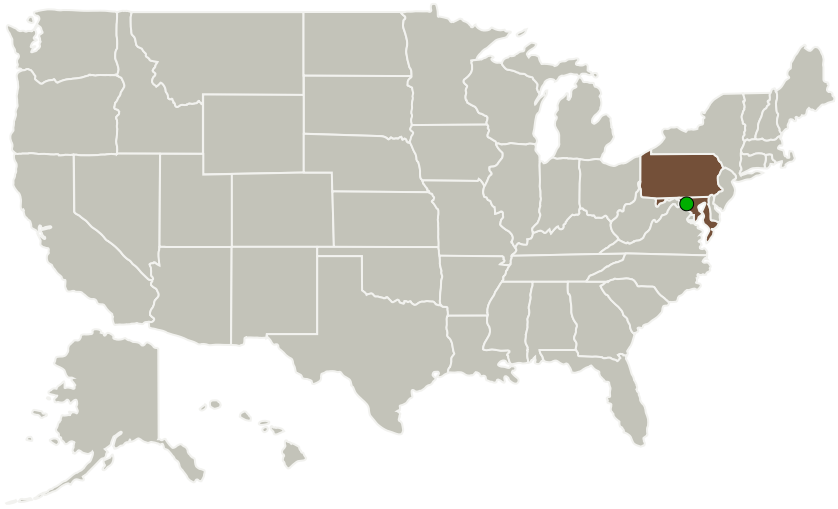
Ultraprecision Pointing Accuracy for SmallSat/CubeSat Attitude Control Systems, Phase I

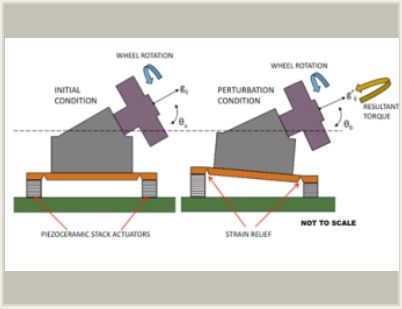
Completed Technology Project (2014 - 2014)

Project Introduction

The primary objective of the Phase I investigation is to develop and demonstrate an innovative solution that can enable very high precision pointing accuracy (<0.08 degree nominal; <0.03 degree extended goal) at fast slew rates; providing part of a advanced Smallsat/CubeSat precision attitude determination and control system (PADCS) that can meet emerging very stringent missions requirements. The Phase I program aim is to design and fabricate initial prototype hardware, including power electronics and Reaction Wheel Assembly (RWA) modifications as to demonstrating such positional accuracy capability, power cost (peak and average power consumption), slew rates and mass/volume cost of the new solution. A critical objective of Phase I will be to develop at the decoupled control architecture for the new multi-stage Attitude Control System ACS controller that will be modeled, simulated, and then converted to hardware prototype for Phase I assessments. This goal is to integrate this prototype controller into a multi-stage (ACS) design hardware emulation testbed and evaluate actual performance before conclusion of the program.

Primary U.S. Work Locations and Key Partners





Ultraprecision Pointing Accuracy for SmallSat/CubeSat Attitude Control Systems Project Image

Table of Contents

Ultraprecision Pointing Accuracy for SmallSat/CubeSat Attitude Control Systems, Phase I

Completed Technology Project (2014 - 2014)

Organizations Performing Work	Role	Type	Location
QorTek Inc	Lead Organization	Industry Small Disadvantaged Business (SDB)	Williamsport, Pennsylvania
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Pennsylvania

Project Transitions

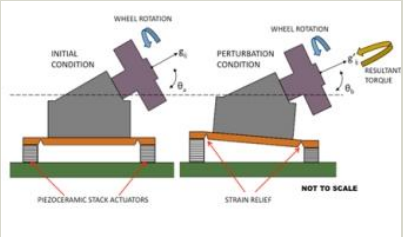
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140597)*

Images



Project Image
Ultraprecision Pointing Accuracy for SmallSat/CubeSat Attitude Control Systems Project Image *(https://techport.nasa.gov/image/126353)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
QorTek Inc

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

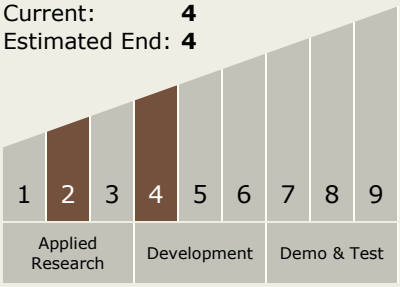
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Gregory M Bower

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Ultraprecision Pointing Accuracy for SmallSat/CubeSat Attitude Control Systems, Phase I

Completed Technology Project (2014 - 2014)

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.2 Navigation Technologies
    - TX17.2.3 Navigation Sensors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System